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International application number: PCT/GB05/000699

International filing date: 24 February 2005 (24.02.2005)

Document type: Certified copy of priority document

Document details: Country/Office: GB
Number: 0406992.8
Filing date: 27 March 2004 (27.03.2004)

Date of receipt at the International Bureau: 09 May 2005 (09.05.2005)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)

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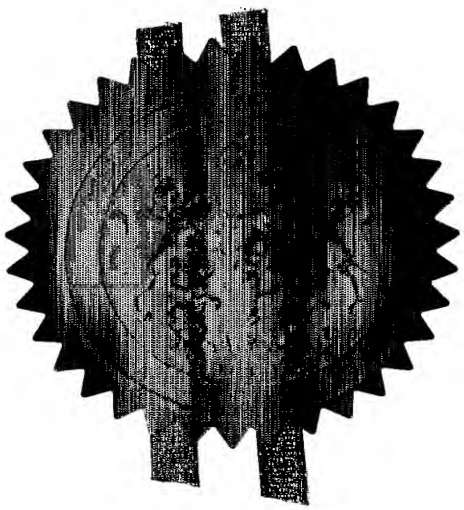

Signed

Dated 8 April 2005

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P01/7700 0.00-0406992.8 NONE

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The Patent Office

Cardiff Road
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NP10 8QQ

1. Your reference — P365631/LBA/GMU

2. Patent application number *(The Patent Office will fill this part in)* — 0406992.8 — 27 MAR 2004

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

Rocep Lusol Holdings Limited
Rocep Business Park
Rocep Drive
Renfrew, PA4 8XY

Patents ADP number *(if you know it)* 68376940002

If the applicant is a corporate body, give the country/state of its incorporation — United Kingdom

4. Title of the invention — "Apparatus for Controlling Flow Rate from a Tiltable Valve Dispenser"

5. Name of your agent *(if you have one)* — Murgitroyd & Company

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

165-169 Scotland Street
Glasgow
G5 8PL

Patents ADP number *(if you know it)* 1198015

6. Priority: Complete this section if you are declaring priority from one or more earlier patent applications, filed in the last 12 months.

Country	Priority application number *(if you know it)*	Date of filing *(day / month / year)*
~~United Kingdom~~		

7. Divisionals, etc: Complete this section only if this application is a divisional application or resulted from an entitlement dispute (see note f)

Number of earlier UK application	Date of filing *(day / month / year)*

8. Is a Patents Form 7/77 (Statement of inventorship and of right to grant of a patent) required in support of this request? — Yes

Answer YES if:

a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or
c) any named applicant is a corporate body.

Otherwise answer NO (See note d)

9. Accompanying documents: A patent application must include a description of the invention. Not counting duplicates, please enter the number of pages of each item accompanying this form:

Continuation sheets of this form	
Description	14
Claim(s)	-
Abstract	-
Drawing(s)	4

10. If you are also filing any of the following, state how many against each item.

Priority documents	-
Translations of priority documents	-
Statement of inventorship and right to grant of a patent (Patents Form 7/77)	-
Request for a preliminary examination and search (Patents Form 9/77)	-
Request for a substantive examination (Patents Form 10/77)	-
Any other documents (please specify)	-

11. I/We request the grant of a patent on the basis of this application.

Signature(s) Date 26/03/2004

12. Name, daytime telephone number and e-mail address, if any, of person to contact in the United Kingdom

GRAHAM MURNANE 0141 307 8400

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e) Once you have filled in the form you must remember to sign and date it.

f) Part 7 should only be completed when a divisional application is being made under section 15(4), or when an application is being made under section 8(3), 12(6) or 37(4) following an entitlement dispute. By completing part 7 you are requesting that this application takes the same filing date as an earlier UK application. If you want the new application to have the same priority date(s) as the earlier UK application, you should also complete part 6 with the priority details.

APPARATUS FOR CONTROLLING FLOW RATE FROM A TILTABLE VALVE DISPENSER

This invention relates to dispensing apparatus and to a user operated valve assembly for use with a dispensing apparatus. Particularly, but not exclusively it relates to a dispensing apparatus and valve assembly for dispensing viscous materials from a container under pressure of a propellant.

It is known to provide a dispensing apparatus which includes a tilt valve mechanism fitted to a container filled with a product, for example mastic or sealant, which is to be dispensed. The user pushes the valve stem to one side to open the valve and dispense product from the pressurised container. However such dispensers are intended for use only in situations where a full flow of product is required. There is no intermediate setting of the valve which permits an intermediate flow rate, and it can be difficult to ensure a steady stream of flow unless the valve is fully open.

It is an object of the present invention to provide a dispensing apparatus which overcomes one or more of the above disadvantages.

According to a first aspect of the present invention there is provided a valve assembly for use with a dispensing apparatus, the valve assembly comprising:

a tilt valve including a valve stem;

a lever coupled to the valve stem;

variable spacer means arranged to limit the travel of the lever by a variable amount according to the relative position of the lever and the variable spacer means.

Preferably the variable spacer means is adapted to prevent travel of the lever in a particular relative position of the lever and the variable spacer means. In this position the lever cannot be operated so that the valve is effectively locked in a closed position.

Preferably the valve assembly includes a nozzle. Preferably the lever is integral with the nozzle. Preferably the nozzle is sealingly engaged with the valve stem.

Preferably the variable spacer means includes a plurality of spacer portions of differing thickness, each spacer portion being arranged to limit the travel of the lever by a predetermined amount. One spacer portion may be arranged to allow a full range

of travel of the lever so that by pressing the lever fully the valve is fully opened. Another spacer portion may be arranged to allow a partial range of travel of the lever so that by pressing the lever fully the valve is opened to an intermediate flow setting. Further spacer portions may be arranged to provide further intermediate flow settings.

Alternatively the variable spacer means may comprise a cam surface arranged to limit the travel of the lever by an amount which varies with the relative position of the lever and the variable spacer means. This allows the user of the valve assembly infinite adjustment of the flow rate by selecting a particular relative position of the lever and the variable spacer means.

In a first preferred embodiment the variable spacer means comprises a collar which in use engages with a container with which the valve assembly is used.

Preferably the spacer portions comprise a plurality of portions of the collar of different height adapted to contact the lever when the lever is at the limit of its travel. Preferably the lever is rotatably mounted relative to the valve so that in use the lever is rotated to select a required limit of travel of the lever and hence a required flow setting of the valve. The collar may be provided with markings to indicate the flow setting associated with each portion of the collar.

Preferably the collar is adapted to press fit on the rolled flange of a standard pressurised container.

In a second preferred embodiment the variable spacer means comprises a collar rotatably mounted around the valve stem beneath lever.

Preferably the spacer portions comprise a plurality of portions of the collar of different thickness adapted to space the lever from the container with which the valve assembly is used when the lever is at the limit of its travel. Preferably the collar is rotatably mounted relative to the valve so that in use the collar is rotated to select a required limit of travel of the lever and hence a required flow setting of the valve. The collar may be provided with markings to indicate the flow setting associated with each portion of the collar. Alternatively the lever could be rotated relative to the valve and the collar fixed.

Preferably the collar is in the form of a clip having a radial slot. In this way the collar can be readily fixed to a valve stem with a lever already in place.

Preferably the collar is mounted on a portion of the nozzle which extends below the lever. This allows the nozzle, lever and collar to be pre-assembled as a nozzle assembly which can then be snap fitted onto the valve stem of a tilt valve at any stage in the manufacturing process.

Preferably the collar is arranged to engage the rolled flange of a container with which the valve assembly is used when the lever is at the limit of its travel.

In a third preferred embodiment the nozzle serves as the lever. Alternatively the lever is provided between the nozzle and the valve stem and is substantially axially aligned with the valve stem. Preferably the variable spacer means is arranged to limit the lateral travel of the nozzle or lever by a variable amount according to the direction in which the nozzle or lever is displaced.

Preferably the spacer means comprises a collar which in use engages with a container with which the valve assembly is used.

Preferably the variable spacer means comprise a plurality of spacer portions. Preferably the spacer portions comprise a plurality of recessed portions of the collar of different depths adapted to contact the nozzle or lever when the nozzle or lever is displaced towards said recessed portion. Each recessed portion provides a different limit of travel of the nozzle or lever and thus corresponds to a different flow setting of the valve assembly.

Alternatively the variable spacer means may comprise a cam surface of the collar adapted to contact the nozzle or lever when the nozzle or lever is

displaced laterally and provide a limit of travel, the limit of travel varying with the direction in which the nozzle or lever is displaced.

The collar may include a sleeve substantially surrounding the valve stem. The collar may be provided with markings to indicate the flow setting associated with each recessed portion.

Preferably the collar is adapted to press fit on the rolled flange of a standard pressurised container.

According to a second aspect of the present invention there is provided a dispensing apparatus comprising a container and a valve assembly according to the first aspect.

Preferably the apparatus comprises means for urging the product from the container. Preferably the container is pressurised. The container may contain a propellant. The container may contain a piston, situated between the propellant and the valve.

Preferably the valve assembly comprises a mounting cup adapted to secure the valve to the container. Preferably the container is provided with a rolled flange portion and the mounting cup is provided with a corresponding flange portion adapted to engage with the rolled flange portion of the container.

Specific embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Fig. 1 shows a collar of a valve assembly according to the invention;

Fig. 2 shows a section through a valve assembly including the collar of Fig. 1 with the lever in a primed position and the valve closed;

Fig. 3 shows a section through the valve assembly of Fig. 2 with the collar in an intermediate flow position and the lever at the limit of its travel with the valve opened to an intermediate flow setting;

Fig. 4 shows a section through the valve assembly of Fig. 2 with the collar in a full flow position and the lever at the limit of its travel with the valve fully open;

Fig. 5 shows a section through another valve assembly according to the invention before attachment of the collar with the lever in a primed position and the valve closed;

Fig. 6 shows a section through the valve assembly of Fig. 5 with the collar attached in an intermediate flow position and the lever at the limit of its travel with the valve opened to an intermediate flow setting;

Fig. 7 shows a section through the valve assembly of Fig. 5 with the collar attached in a full flow position and the lever at the limit of its travel with the valve fully open;

Fig. 8 shows an exploded view of another valve assembly according to the invention;

Fig. 9 shows the valve assembly of Fig. 8 in an assembled state; and

Fig. 10 shows a section through the valve assembly of Fig. 8.

Referring to Figs. 1 to 4 of the accompanying drawings, there is disclosed a valve assembly 10 fitted on a container 12 to form a dispensing apparatus 11. In this example, the container 12 is an aluminium monoblock container of the sort widely used in aerosol applications. It is envisaged that the can 12 could be of tin plate, steel or any conventional can construction having a standard one inch (25 mm) hole in the top. The can may be internally lacquered. However the valve assembly of the present invention can be used with a container 12 of any material holding a pressurised product, for example a container of plastic, glass or metal.

The valve assembly 10 includes a valve 14, a nozzle assembly 16, a lever 18 and a collar 20 secured to the container 12. The valve is a tilt valve of the

type widely used in pressurised dispensers and operated by tilting the valve stem 30. The valve stem 30 is a hollow plastic tube with apertures 32 in the tube wall at the lower end. The upper end 34 is open, while the lower end is closed by a plastic sealing disc 36. A resilient grommet 38 of rubber or synthetic material surrounds the lower portion of the stem 30 and is held in place by the sealing disc 36 and a retaining collar 31 formed on the outside of the stem 30.

The grommet 38 is sealed to a mounting cup 44 of metal. The mounting cup has an outer flange 48 which is adapted to fit around a rolled flange 13 which extends around the opening of the container 12. When the stem 30 is tilted, the sealing disc 36 is pushed away from the grommet 38 on one side, and material in the container 12 is free to pass between the sealing disc 36 and grommet 38, through the apertures 32, along the inner bore of the stem 30 and through the open end 34 of the stem. When the stem is released, the resilience of the grommet 38 pushes the stem back to the position shown in Fig 2.

The nozzle assembly 16 includes a nozzle 22 at its upper end. In the example the nozzle 22 is angled, but it may be straight or positioned at a different angle. In the example the lever 18 is integrally formed with the nozzle assembly 16 as a one-piece plastic moulding, but it may be attached separately. The nozzle assembly sealingly engages at its lower end with the valve stem. This can be by a screw

thread or snap fit or any other appropriate engagement means. The nozzle 22 may be provided with a removable nozzle cap (not shown).

The collar 20 is shown in more detail in Fig. 1. The collar 20 is a ring shaped collar formed of moulded plastic and includes a circular groove 50 in its lower face which is adapted to snap fit over the rolled flange 13 of the container and/or the outer flange 48 of the mounting cup 44.

The collar 20 is a variable spacing means and has a number of spacer portions 52, 54, 56, each of different height, arranged about the collar. In use the lever 18 is rotated until it extends over the required spacer portion. The user then depresses the lever until the underside 60 of the lever 18 contacts the top of the spacer portion, at which point the lever 18 is at the limit of its travel. By positioning the lever over a different spacer portion 52, 54, 56 the user selects a different limit of travel and therefore a different flow setting of the valve. Fig 3 shows the lever 18 fully depressed over spacer portion 56, with the valve 14 opened to an intermediate flow setting. Fig 4 shows the lever 18 fully depressed over spacer portion 52, with the valve 14 opened to a fully open flow setting.

To dispense product, a user presses down on the handle 62 of the lever, moving it from the primed position shown in Fig 2 towards the body of the

container 12 to adopt the dispensing position shown in Fig 3 or 4. Because there is a predetermined valve position associated with each dispensing position, product is urged to flow, by virtue of the internal pressurisation of the pack, at a constant predetermined rate through the ports 32 and up through the valve stem 30 and out through the nozzle 22.

To stop dispensing, the user simply releases the handle 62. This closes the valve by allowing the valve stem 30 to tilt back to the position shown in Fig 2 and close access through the ports 32.

The collar 20 may include a further spacer portion (not shown) which is higher than the other spacer portions 52, 54, 56 and which extends to the underside 60 of the lever 18. The lever could then be rotated to extend over the higher spacer portion to prevent travel of the lever and effectively lock the valve in a closed position. If required the collar may include a corresponding projection diametrically opposite to prevent the lever being pivoted in the opposite direction when the lever is in the "locked" position.

Figs 5 to 7 show a further embodiment of a valve assembly 10' according to the invention. The container 12, valve 14, nozzle assembly 16 and lever 18 are the same as those described above with reference to Figs 2 to 4, and so are not described further.

In this embodiment the variable spacer means is a ring-shaped collar 80 with a radial slot (not shown) adapted to clip around the shaft of the nozzle assembly 16 beneath the lever 18. In the illustrated embodiment of Figs 6 and 7 the collar has two spacer portions 82, 84, although the number of spacer portions can be varied. In use the lever 18 or collar 80 is rotated until the lever 18 extends over the required spacer portion 82, 84. The user then depresses the lever until the lever 18 urges the spacer portion into contact with the flange 13 of the container 12, at which point the lever 18 is at the limit of its travel. By positioning the lever over a different spacer portion 82, 84 the user selects a different limit of travel and therefore a different flow setting of the valve. Fig 6 shows the lever 18 fully depressed over spacer portion 82, with the valve 14 opened to an intermediate flow setting. Fig 7 shows the lever 18 fully depressed over spacer portion 84, with the valve 14 opened to a fully open flow setting.

Operation is as described for the first embodiment. The collar 80 may include a further spacer portion (not shown) which is deeper than the other spacer portions 82, 84 and which extends over height H as shown in Fig 5 when the lever 18 is in the at-rest position. The lever 18 or collar 80 could then be rotated to prevent travel of the lever and effectively lock the valve in a closed position. If required the collar 80 may include a corresponding

projection diametrically opposite to prevent the lever being pivoted in the opposite direction when the lever is in the "locked" position.

Figs 8 to 10 show a further embodiment of a valve assembly 10" according to the invention. The container 12 and valve 14 are the same as those described above with reference to Figs 2 to 4, and so are not described further.

In this embodiment nozzle assembly 90 acts as a lever, and the product is dispensed by displacing the nozzle assembly 90 laterally. The variable spacer means is a collar 92 which has a top plate 94 and a sleeve 96 which extends down from the top plate to form a flush connection with the wall of the container 12. The collar 92 includes an internal tubular wall 98 which positively engages with the rolled flange 13 which extends around the opening of the container 12.

The top plate 94 of the collar 92 has three recessed portions 100, 102, 104. The recessed portion 100 is the shallowest of the three. When the nozzle assembly 90 is operated in the direction of the shallowest recessed portion 100 the tilt valve 14 can only partially open, so that product flows from the container 12 at a slow flow rate. When the nozzle assembly 90 is operated in the direction of the middle recessed portion 102 the tilt valve 14 can open to a greater extent, so that product flows from the container 12 at a medium flow rate. When

the nozzle assembly 90 is operated in the direction of the deepest recessed portion 104 the tilt valve 14 can open fully, so that product flows from the container 12 at the maximum flow rate.

Markings 106 can be provided on the collar 92 to indicate the flow rate associated with each recessed portion 100, 102, 104. The top plate 94 is provided with a flange 108 of the same diameter as the rolled flange 13 of the container 12, so that a cap 110 adapted to fit on the rolled flange 13 can also fit on the collar 92.

Modifications and improvements may be made to the foregoing without departing from the scope of the invention. In particular the step-like spacer portions 52, 54, 56, 82, 84 or recesses 100, 102, 104 of the illustrated embodiments may be replaced by cam surfaces which allow quasi-infinite adjustment of the maximum travel of the lever. The variable spacer means 20, 80, 92 may have shapes and forms other than those illustrated. The shape and form of the lever 18 and nozzle assembly 90 may be varied. The collar 82, 84 may be rotatably or slidably fixed to the underside 80 of the lever. The spacer portions may be adapted to bear on a part of the container 12 or mounting cap 44 other than the rolled flange 13. The spacer portions 52, 54, 56, 82, 84 may be provided with locating grooves or other means to encourage engagement with the lever 18 at particular relative rotational positions.

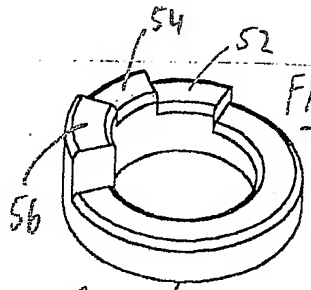
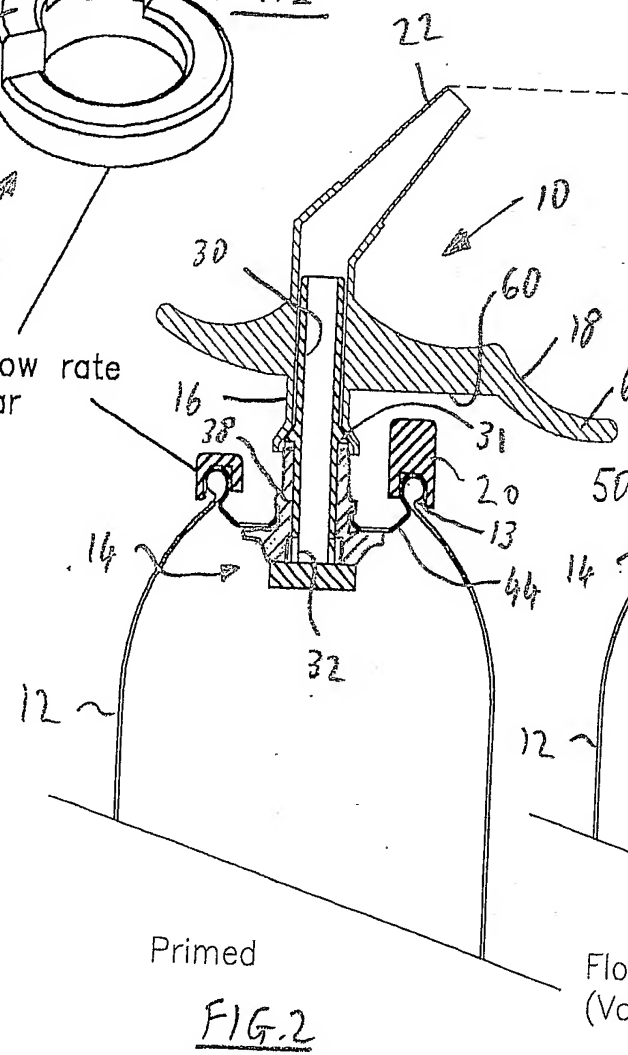


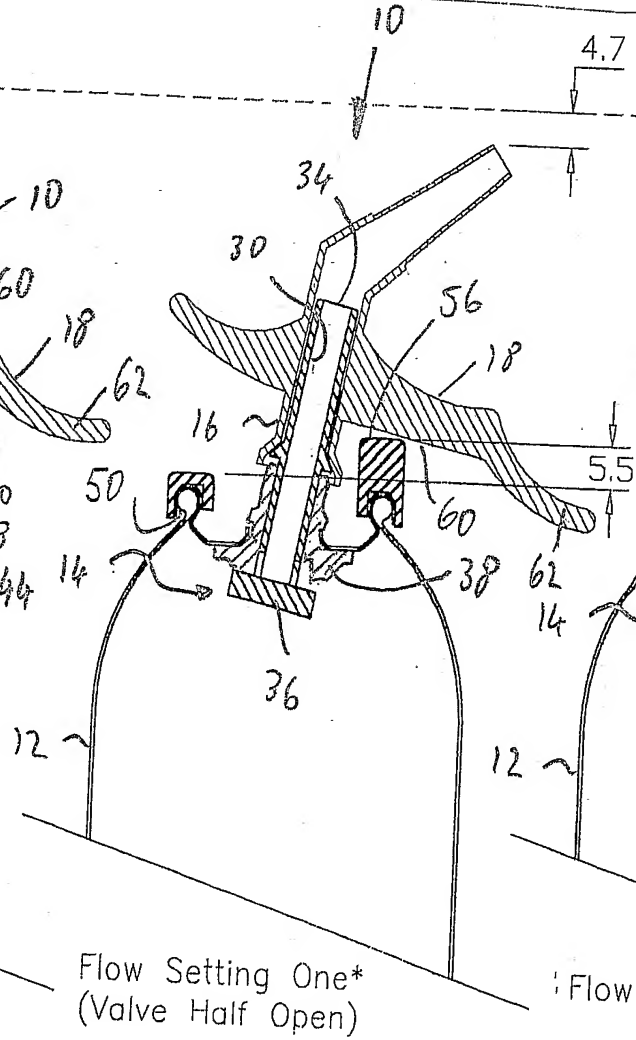
FIG. 1

3 flow rate collar



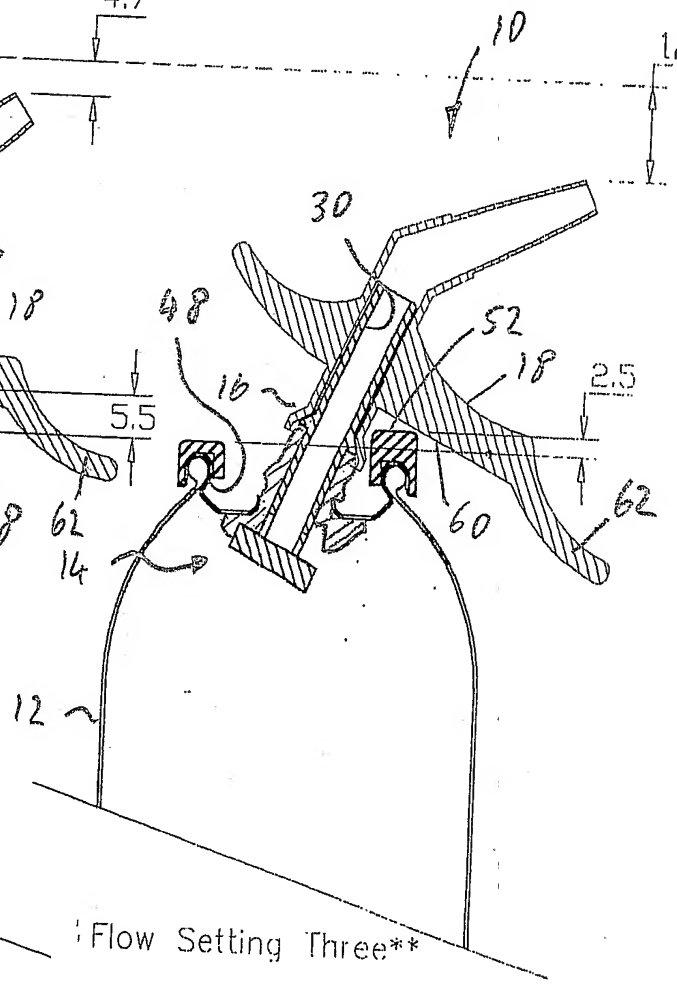
Primed

FIG. 2



Flow Setting One*
(Valve Half Open)

FIG. 3



Flow Setting Three**

FIG. 4

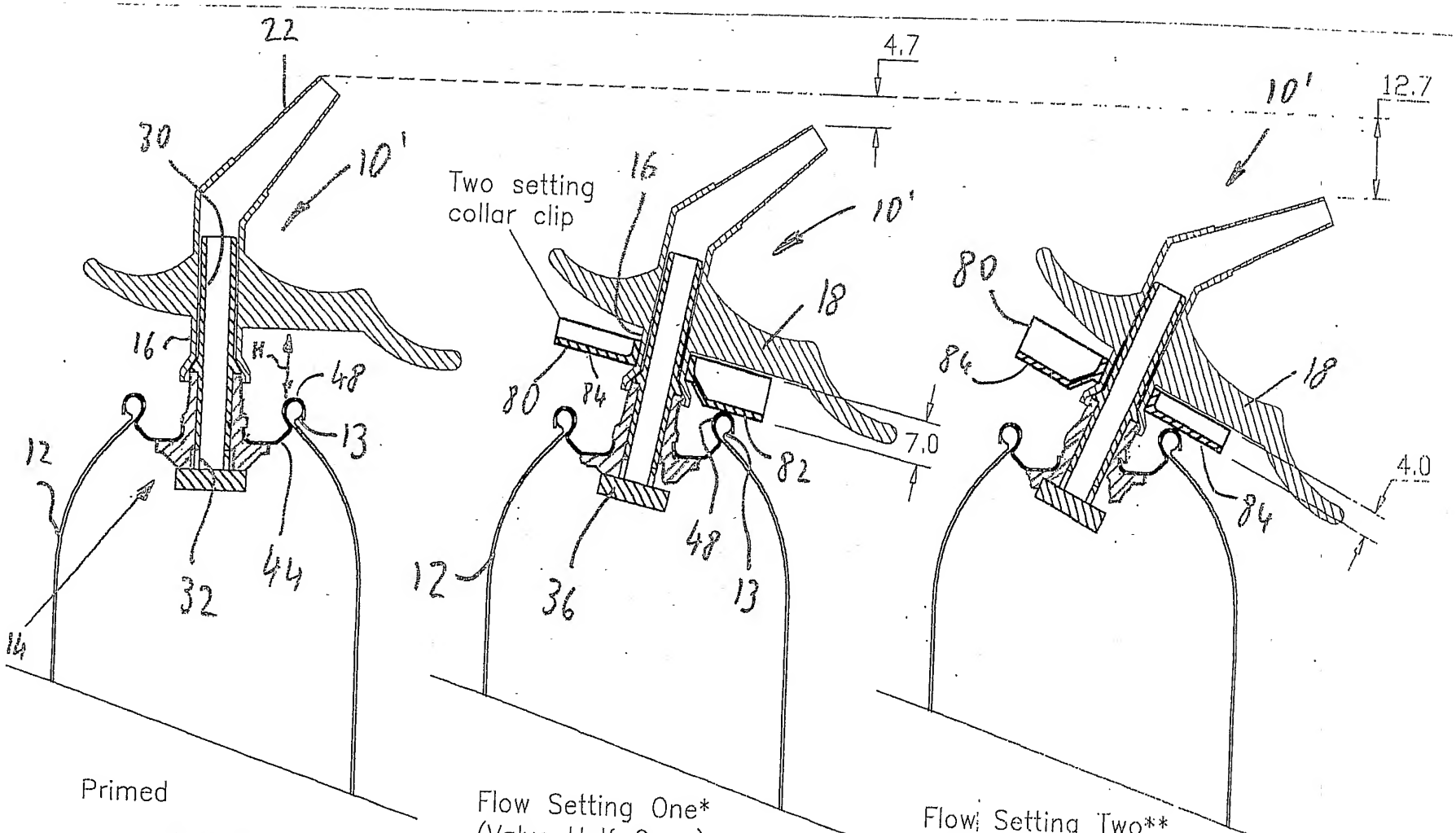
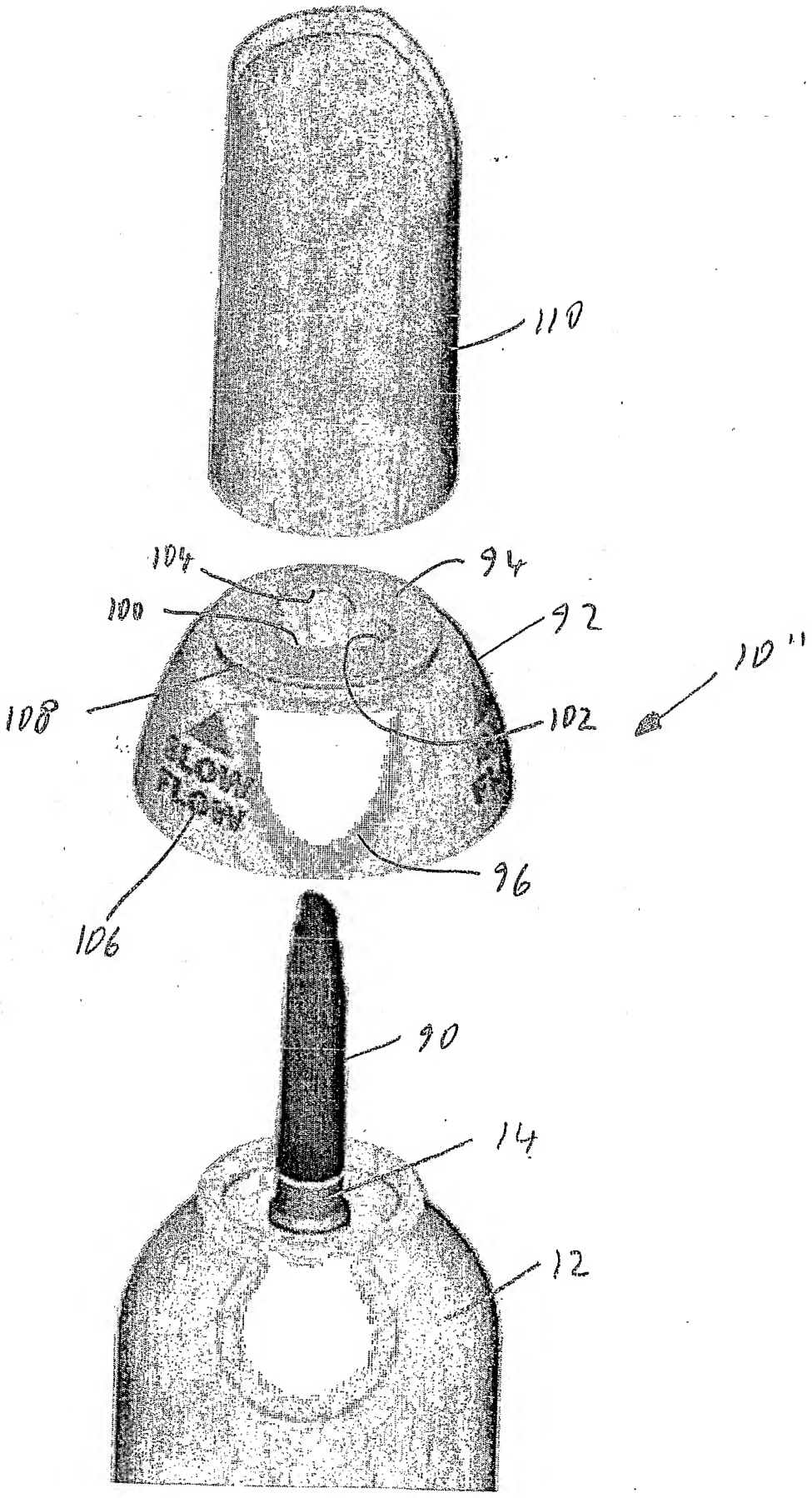


FIG. 5

FIG. 6

FIG. 7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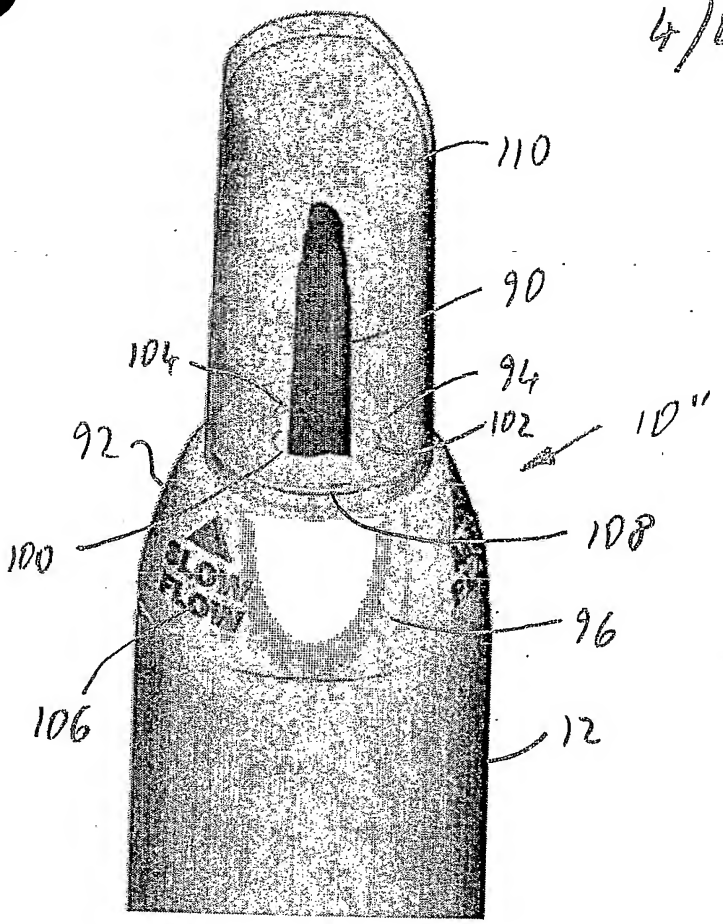
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90
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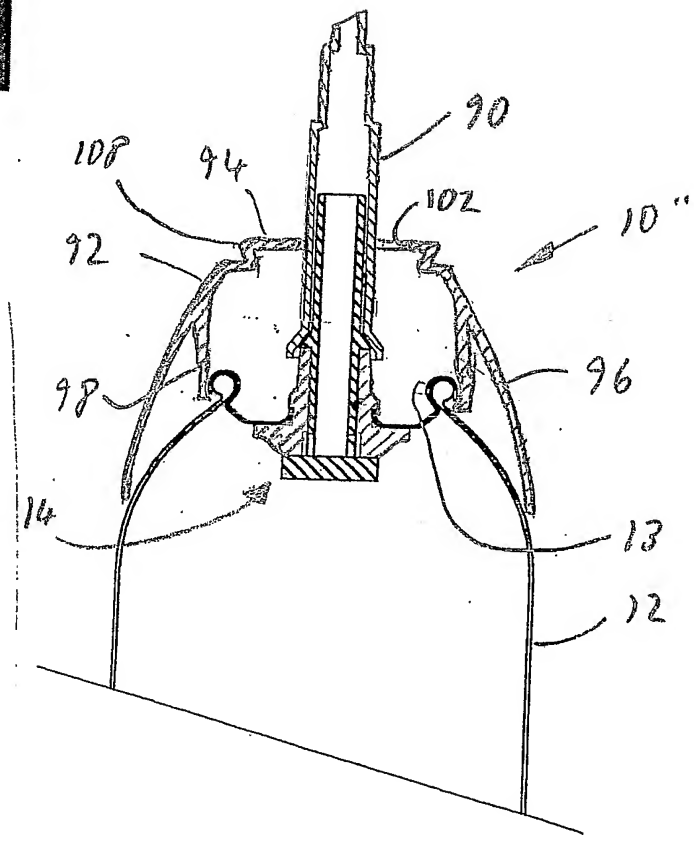
94
92
102
10"
100
108
SLOW FLOW
96
106
12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